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AUTHOR Jackson, Evelyn W.; And Others
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ABSTRACT

The Medical/Dental Education Preparatory Program (MEDPREP) at Southern Illinois University School of Medicine at Carbondale prepares underrepresented minorities for medical school admission. This paper reports on the evaluation of the MEDPREP Summer Review program by the comparison of participant and non-participant score gains on the Medical College Admissions Test (MCAT). The eight week Summer Review courses review biology, chemistry, physics, and quantitative topics covered by the MCAT. Data were collected from all MEDPREP students from 1977 to 1983 having MCAT scores from both before and after MEDPREP enrollment. The review program resulted in significant gains in all subtests, compared to moderate gains on three subtests by nonparticipants. Summer Review group gain was significantly greater only on the Quantitative subtest. While this study demonstrates the ability of the Summer Review Program, other factors may be responsible for the gains. (BS)

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# A COMPARISON OF REPEATER PERFORMANCE ON THE MCAT: REVIEW COURSE PARTICIPANTS VS. NON-PARTICIPANTS

Paper presented at the 1985 Annual Meeting of the
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by

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Evelyn W. Jackson, Ph.D.
Beth Dawson-Saunders, Ph.D.
Rosalyn B. Green, Ph.D.

School of Medicine
Southern Illinois University
Carbondale, Illinois

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A Comparison of Repeater Performance on the MCAT:
Review Course Participants vs. Non-Participants

Much research has been done on the effects of coaching for standardized aptitude and achievement tests. The review of the literature reveals varying results depending on the structure, content and methods used in the preparation program. It appears that coaching is most effective if a broad-based perspective is taken when planning for the improvement of scores (McGee and Rose, 1982). Additionally, as pointed out by Anderson (1981), there are two parts to coaching for tests: 1) training in test-taking skills or "test-wiseness" and 2) coaching in the skill areas of knowledge measured by the test.

Sarnacki (1981) considered the effects of test-wiseness training and level of test-wiseness (TW) on multiple choice item type performance on standardized (NBME, Part 1) and teacher-made examinations in undergraduate medical education. He found that those subjects trained in TW skills obtained significantly higher mean scores on one of four multiple choice formats (K-type). However, no significant differences were evidenced on either of two in-house teacher-made examinations. It was therefore concluded that certain conditions, inherent only in standardized tests, must be present before susceptibility to the extraneous source of variance of TW is evidenced.

In a survey of review programs for the Part I Exam of the National Board of Medical Examiners (NBME) by Litzinger and Welker (1979), twenty-nine of seventy-nine respondent medical schools indicated an organized program of board preparation. The offerings consisted primarily of lectures and/or self-study, employing the use of review questions, test-taking practice and programmed sessions. Weber and Hamer (1982) studied the effect of review courses upon students' NBME Part I performance and found a school's policy of offering

or recommending a review course was associated with a small, but statistically significant increment in Part I scores.

Jones and Beran (1980), in a descriptive study on repeat test performance on the MCAT, found significant score changes for all six subtests. Scores in the Reading and Quantitative skills areas were found to be more constant than the four science areas, possibly because the latter measure more directly the knowledge and skills learned in courses of study. Of the science subtests, Chemistry had the lowest mean increase, but the dispersion of scores on the repeat administration was larger. The science subtest with the greatest improvement in both absolute score units and standard deviation units occurred in Science Problems. Although there was no accounting for what students did between the two administrations of the test, the authors felt that scores on MCAT subtests more related to a specific discipline would be influenced by preparation and review activities which were delivered over an extended period of time.

Hynes and Givner (1980) found significant improvement in MCAT subtest scores on a second testing occasion for those students whose performance was lower than predicted on the basis of past academic performance. The students whose performance was better than predicted, on the other hand, failed to demonstrate significant improvement on the second test.

BACKGROUND. Southern Illinois University School of Medicine is, and has been, committed to increasing the number of practicing minority physicians and dentists. For thirteen years (September 1972 - present) Southern Illinois University School of Medicine has operated a year-round program to increase the number of applicants from groups traditionally underrepresented in medicine and dentistry. The Medical/Dental Education Preparatory Program (MEDPREP) is located on the Carbondale campus.

MEDPREP has its own teaching faculty and special tutorials, seminars and classes are offered to enrolled students. MEDPREP students also enroll in regular preprofessional university courses offered on the Carbondale campus. MEDPREP is not a degree-granting program. It is designed to help undergraduate as well as post baccalaureate students enhance their credentials for applying to professional school.

MEDPREP's academic offerings range from courses designed to review the basic science areas required by most medical schools to developmental courses in basic skills to enriched science courses which are representative of first-year medical school coursework. As a program of the SIU School of Medicine, MEDPREP is also able to provide students with unique experiences and courses not usually available to preprofessional students. MEDPREP students have opportunities to interact with medical students and faculty and to observe the delivery of health care in area health facilities.

As part of its program to prepare underrepresented minorities for admission to medical school, MEDPREP conducts a program unofficially called "Summer Review." Students register for a total of six hours of coursework offering review in the biology, chemistry, physics and quantitative topics covered by the MCAT. MEDPREP follows the university's 8 week summer term schedule and classes for the above four courses are held 5 days a week, roughly from 7:30-3:50 with a 45 minute lunch break. There are approximately 60 hours of scheduled biology lectures, 26 hours of physics review, 22 hours of inorganic chemistry, 20 hours of organic chemistry and 26 hours of quant review. In addition to the scheduled lecture hours, help sessions conducted by the various instructors are interspersed throughout the schedule. In order to evaluate the effectiveness of the Summer Review Program, data were

collected on 52 students participating in the program between 1977 and 1983 who had taken the MCAT examination prior to enrolling and who subsequently retook the examination following the review. A control group consisted of students during the same period of time who enrolled in MEDPREP without taking the Summer Review and for whom two sets of MCAT scores were available. The purpose was, of course, to compare the gains of each group and to determine the effectiveness of the Summer Review program.

METHOD. The sample of subjects is described above: all students in MEDPREP from 1977 to 1983 who had two sets of MCAT scores, one set taken before enrolling in MEDPREP and one set after. Comparisons of scores to determine gain, if any, were made for two separate groups of students: those who participated in the Summer Review program designed specifically to review science topics tested by the MCAT, and those who did not participate in the eight-week review program. Statistical comparisons were made using analysis of covariance with the first set of MCAT scores as covariates. Analysis of variance with repeated measures was also performed to check the consistency of the results from the covariance analysis. As a follow-up, gains between groups were compared using the independent t-test, and paired t-tests were used to examine gains within each group.

RESULTS. Fifty-two students who had two sets of MCAT scores participated in the Summer Review program during the seven-year period. Gains were made in all MCAT subtests, significant at .005 in Reading Skills and significant at .001 in all other subtests (see Table 1). The control group who had two sets of MCAT scores but did not participate in the summer program numbered 21, and were observed to have significant gains only on the biology, physics, and science problems subtests, all at the .05 level. When the gain scores were

compared for the two groups (Table 2), only on the Quantitative subtest did the Summer Review group demonstrate a more significant gain than the group with no review. The results of these analyses were confirmed by the analysis of covariance ($F = 6.51$, $p = .013$ for the Quantitative subtest; all others not significant) and the repeated measures analysis ($F = 8.17$, $p = .006$ for the interaction term on the Quantitative subtest; all others not significant).

DISCUSSION. The present study has demonstrated the utility of a Summer Review program designed to help traditionally underachieving students improve their scores on the MCAT examination. The review program resulted in significant gains on all subtests, compared to moderate gains on three subtests achieved by a group of students who did not participate in the review program. The actual amount of gain in scores was statistically greater in the Summer Review group only on the Quantitative subtest.

It may be, of course, that factors other than the review itself are responsible for the gains. The students were not randomly assigned to review or not review, and it may be that those who took the review program were more motivated to improve their scores. The group taking Summer Review may have been more motivated because their MCAT scores, on the average, were lower than those not taking the review. On the other hand, it could be argued that students who take such a review course are most in need of a structured format for review.

The fact that three of the scores increased for the group who did not participate in the Summer Review program may mean that these students studied these topics on their own. It is logical to expect that students review the topics that are outlined for students in the MCAT Student Manual prepared by the Association of American Medical Colleges. While it is a matter of record that

they did not take the 8-week Summer Review offered by MEDPREP it has not been determined what other course work they may have taken or what preparatory material they may reviewed. The fact that the Quantitative subtest scores were unchanged for this group may be a function of the difficulty there is in finding a class that would be good preparation for this subtest.

Table 1: Mean MCAT Scores and Paired t-test Results

| | Summer Review [1] | | | No Summer Review [2] | | |
|---|---|---|---|---|---|---|
| MCAT Subtest | First MCAT | Second MCAT | | First MCAT | Second MCAT | |
| | $\bar{X} \pm s$ | $\bar{X} \pm s$ | p | $\bar{X} \pm s$ | $\bar{X} \pm s$ | p |
| Biology | 5.4 ± 1.7 | 7.0 ± 1.7 | *** | 6.0 ± 2.2 | 7.5 ± 2.1 | * |
| Chemistry | 5.4 ± 1.3 | 6.3 ± 1.4 | *** | 5.4 ± 1.2 | 6.0 ± 1.7 | |
| Physics | 5.3 ± 1.4 | 6.3 ± 1.9 | *** | 5.2 ± 1.4 | 6.0 ± 1.8 | * |
| Science Problems | 5.3 ± 1.3 | 6.3 ± 1.6 | *** | 5.8 ± 1.8 | 6.5 ± 1.5 | * |
| Reading | 4.6 ± 2.2 | 5.4 ± 2.3 | ** | 5.4 ± 2.7 | 6.3 ± 2.6 | |
| Quantitative | 4.4 ± 1.6 | 5.6 ± 2.1 | *** | 5.0 ± 2.3 | 5.2 ± 2.1 | |

*p<.05, **p<.005, ***<.001

([1]) 51 degrees of freedom

([2]) 20 degrees of freedom

Table 2: Mean Gain Scores and t-test Results

| | Summer Review | No Summer Review | p* |
|---|---|---|---|
| MCAT gain score | $\bar{X} \pm s$ | $\bar{X} \pm s$ | |
| Biology | 1.5 ± 1.8 | 1.5 ± 2.7 | .99([1]) |
| Chemistry | 0.9 ± 1.3 | 0.6 ± 1.6 | .48 |
| Physics | 1.0 ± 1.8 | 0.7 ± 1.3 | .38 |
| Science Problems | 0.9 ± 1.7 | 0.9 ± 1.7 | .97 |
| Reading | 0.8 ± 1.9 | 0.9 ± 2.6 | .91([2]) |
| Quantitative | 1.2 ± 1.6 | 0.1 ± 1.1 | .001([3]) |

*df = 71 unless noted below

([1]) Separate variance estimate df = 27.5

([2]) Separate variance estimate df = 29.5

([3]) Separate variance estimate df = 55.4

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References

Anderson, S. B. (1981, February). Testing and Coaching. Paper presented at the meeting of the American Association of School Administrators, Atlanta, GA.

Hynes, K., and Givner, N. (1980). An empirical investigation of changes in MCAT scores upon retest. Journal of Medical Education, 55, 201-202.

Jones, R. F., and Beran, R. L. (1980). Test repeater performance on the New Medical College Admission Test (Report #80-1). Washington, D. C.: Association of American Medical Colleges.

Litzinger, M. J., and Welker, W. J. (1979). Part I exam of the National Board of Medical Examiners. Journal of Medical Education, 54, 111-112.

McGee, J. C., and Rose, J. S. (1982). Improving test scores: Focus on the SAT. NASSP Bulletin, 66, 59-62.

Sarnacki, R. E. (1981). The effects of test-wiseness in medical education. Evaluation and the Health Professions, 4, 207-221.

Weber, D. J., and Hamer, R. M. (1982). The effect of review courses upon students' performance on a standardized medical college examination. Evaluation and the Health Professions, 5, 335-343.

Mean Scores on MCAT Examinations